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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,581	01/31/2006	Takehito Mizuno	Q92885	5116

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EXAMINER	
MENON, KRISHNAN S	
ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
12/02/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/566,581	MIZUNO ET AL.	
	Examiner	Art Unit	
	Krishnan S. Menon	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *18* is/are pending in the application.

4a) Of the above claim(s) *18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim 18 is pending as amended in the RCE of 11/16/0-9.

Claim Rejections - 35 USC § 103

1. Claims 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over, Lai, et al (US 5,871,650), Matsukata (US 2001/0012505) and JP 07-330326 A (English Machine Translation)

Lai teaches zeolite membranes which are columnar (fig 6), and which are within 15 degrees, and preferably 5 degrees of the normal (column 7, lines 45-56), and having interstitial space (grain boundary layer) of 4- 20 nm (column 4, line 55). The support substrate can be tubular – see claim 19. The tubular support having both ends open is implied – the reference does not teach that the tube ends are or have to be closed.

Regarding the dimensions of the substrate tube, the reference teaches that any type of substrate can be used, including tubular. Obviously, the dimensions of the tubular support are something one of ordinary skill in the art could select/design as desired. Applicant has not shown any criticality for the dimensions of the tubular support.

Lai teaches MFI zeolite, which is same as ZSM-5, but does not appear to teach A-type. However, the MFI and A-type can be similarly synthesized according to Matsukata as shown below, which means it would be obvious to one of ordinary skill to have A-type zeolite membranes just as the MFI of Lai. Further evidence of A-type

membrane with specifically oriented crystals is taught by **the JP reference** – see paragraphs 0016-0020 and working examples, which is cited by Matsukata.

Matsukata teaches zeolite membranes oriented perpendicular to the substrate tube (fig 1b, 4, and example 1). Even if the reference does not explicitly state that the membrane is perpendicular to the substrate, it appears to be so form the figures 1a and 1b, and would also be inherently so from the hydrothermal synthesis process. The Examiner believes that the "b-axis" of the crystal id in fact perpendicular to the substrate, as evidenced by the NPL publication to Zamaro et al, in the Science Direct (2006). The grain boundary layer thickness in the range 2-50 nm would be an inherent property of the zeolite crystals.

This reference teaches the dimensions of the tube within range as recited. However, tube dimensions can be selected as desired by one of ordinary skill, and does not appear to be critical.

Arguments traversing this rejection are not persuasive – applicant has not provided any evidence to show that the crystals of the reference example 1 are not oriented perpendicular to the substrate.

Matsukata teaches in paragraphs 0002 and 0003 that specifically oriented A-type zeolite membranes are well known and that such membranes in Mordentite as his invention. Thus Matsukata would anticipate the claimed subject matter. It would also be obvious to one of ordinary skill in the art to have A-type zeolite membrane with the similar structure as is taught by Matsukata

> [0002] For example, JP-A-7-330326 discloses a zeolite membrane which is formed on a single crystal substrate of an oxide, a semiconductor or a metal and oriented in a specific crystalline direction, and zeolite membranes of A type, Y type and the like are given in the examples.
>
> [0003] In addition, WO92/13631 discloses zeolite membranes comprising an oriented single layer of ZSM-5 (MFI), an A type, a Y type, an X type and the like. WO97/25272 discloses an MFI zeolite membrane oriented along the b axis and a method for producing the membrane. Further, WO96/01683 discloses an MFI zeolite membrane oriented along the a axis and the c axis and the method for producing the membrane.
>
> [0004] However, a mordenite (MOR) zeolite membrane oriented in a specific crystalline direction is not known till now. An MOR zeolite membrane is superior in acid resistance in comparison with zeolite membranes of an A type, a Y type and the like, and it is extremely useful if such an MOR zeolite membrane can be obtained.

Therefore, considering all the evidences presented herein, it would be obvious to one of ordinary skill in the art that A-type zeolite membranes having the structure claimed is well known and therefore not patentable. It would also be obvious to one of ordinary skill to obtain such a membrane using the teachings of these references if one desires to have an A-type membrane for any reason.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S. Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on 571-272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Krishnan S Menon/
Primary Examiner, Art Unit 1797